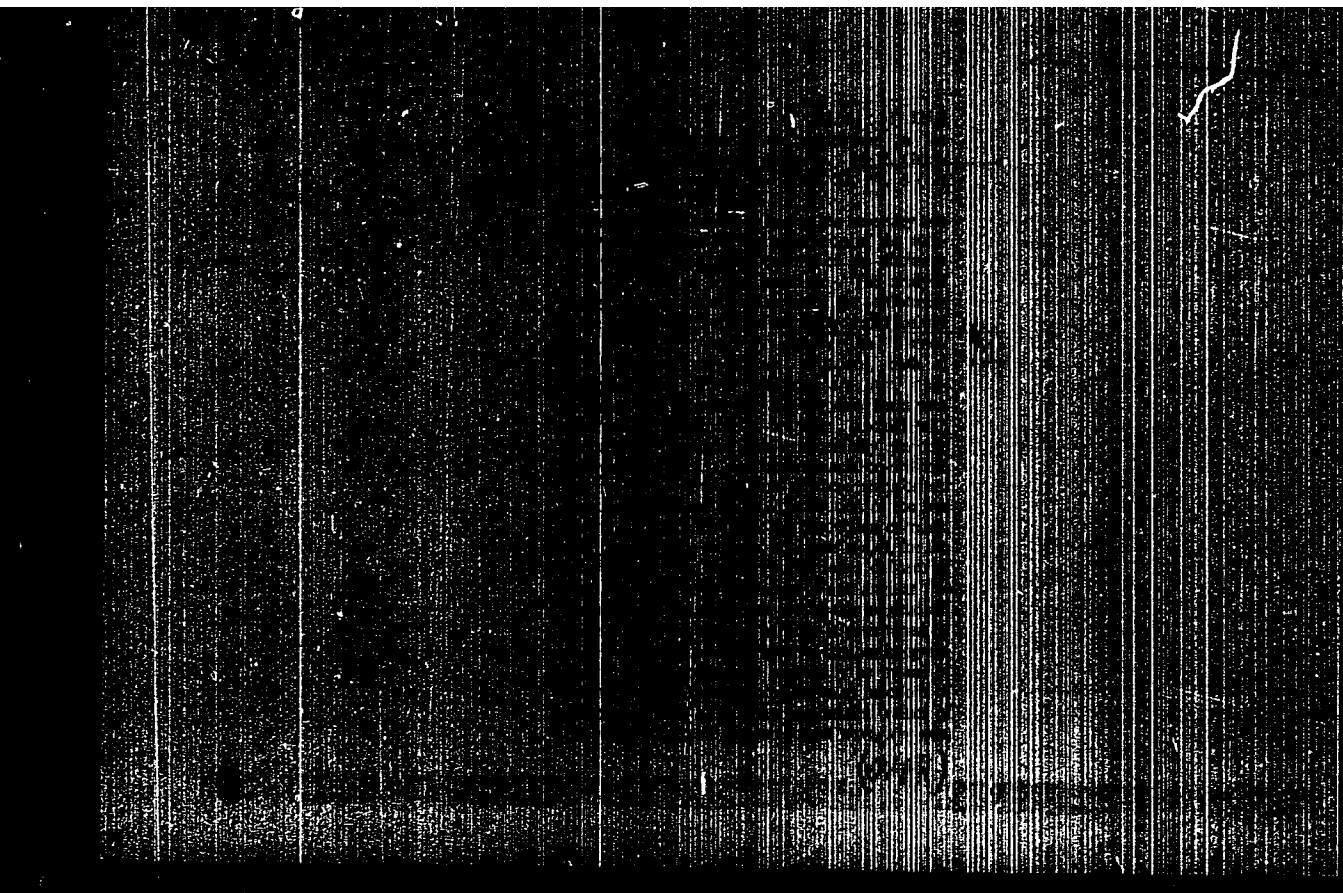


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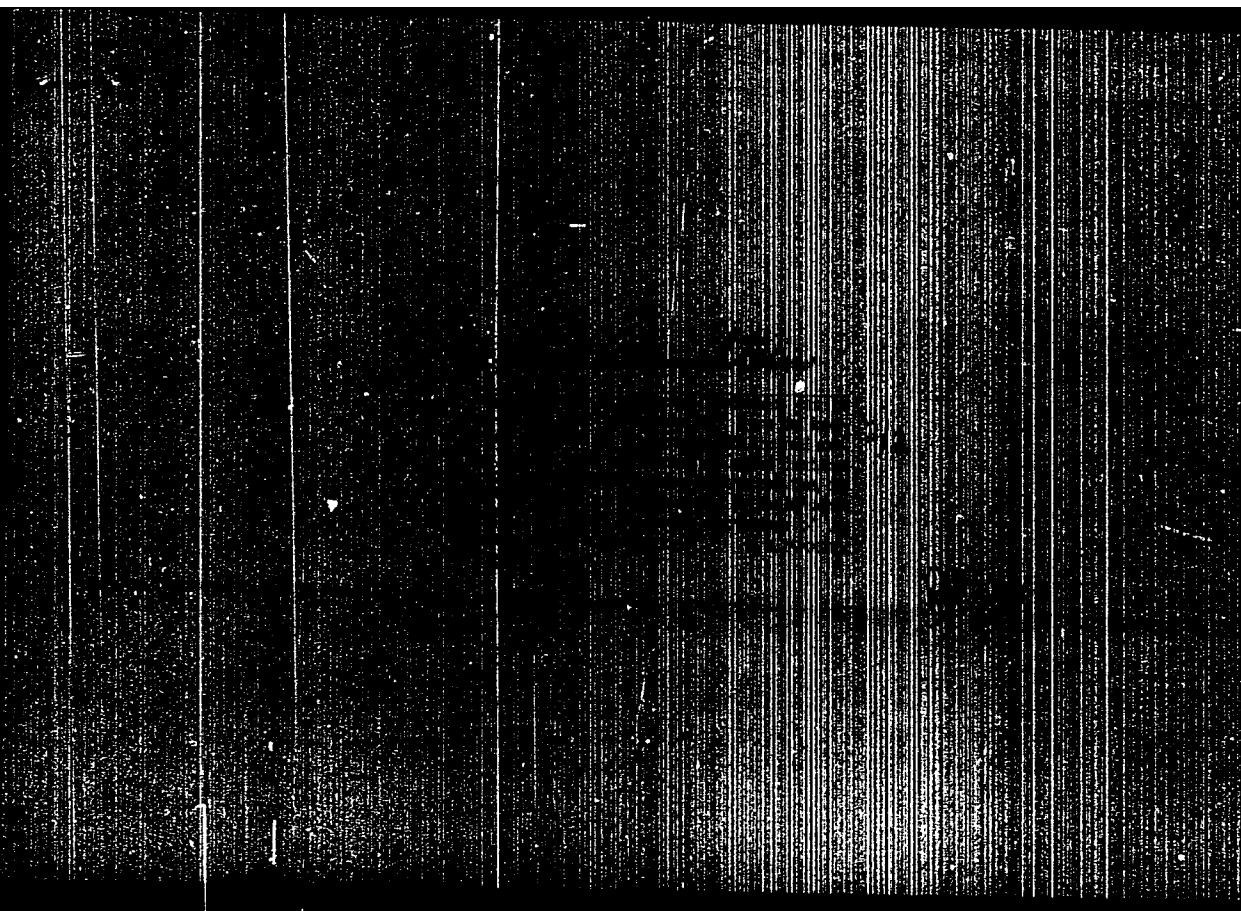


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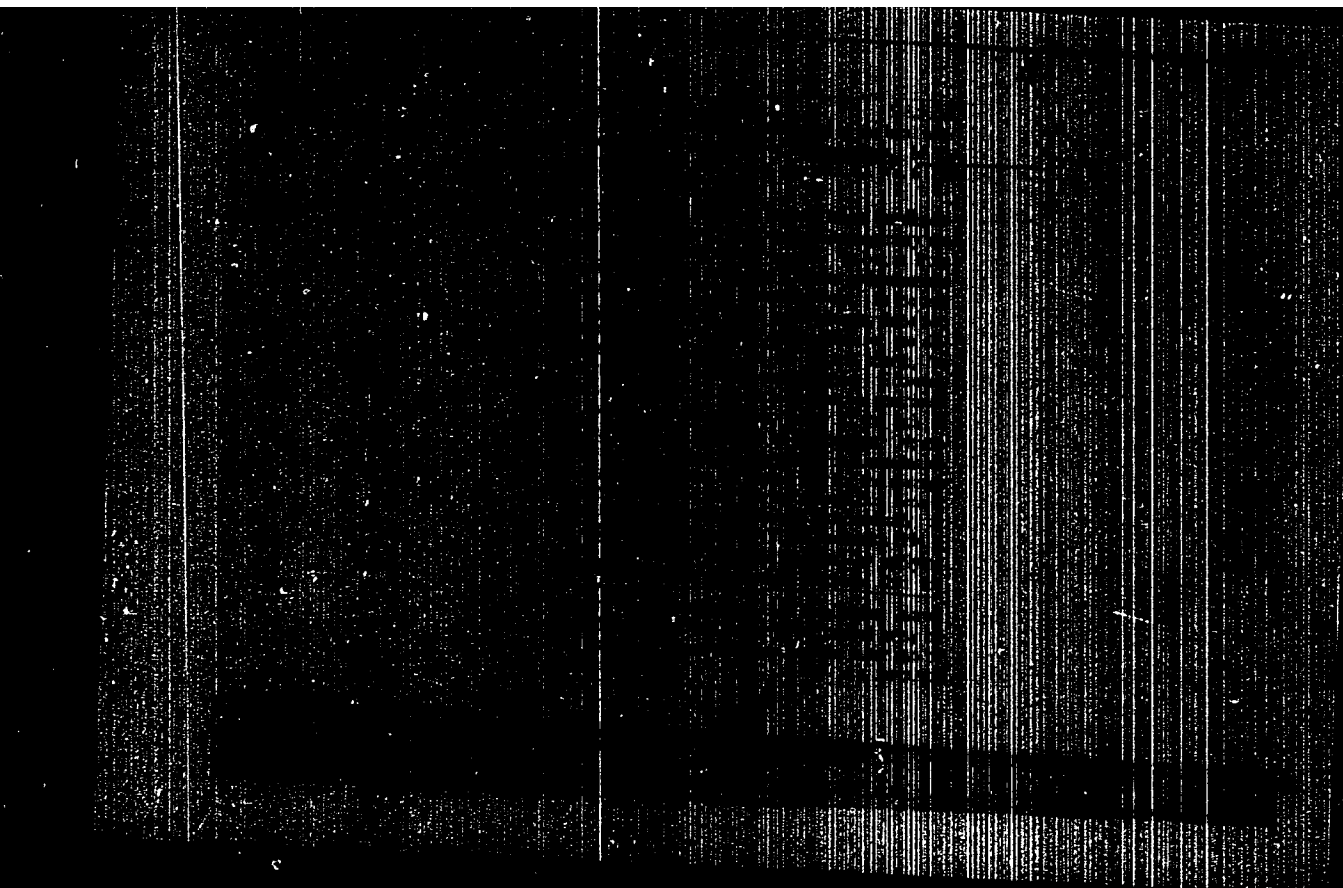


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GERTSENSHTEYN, M.Ye.

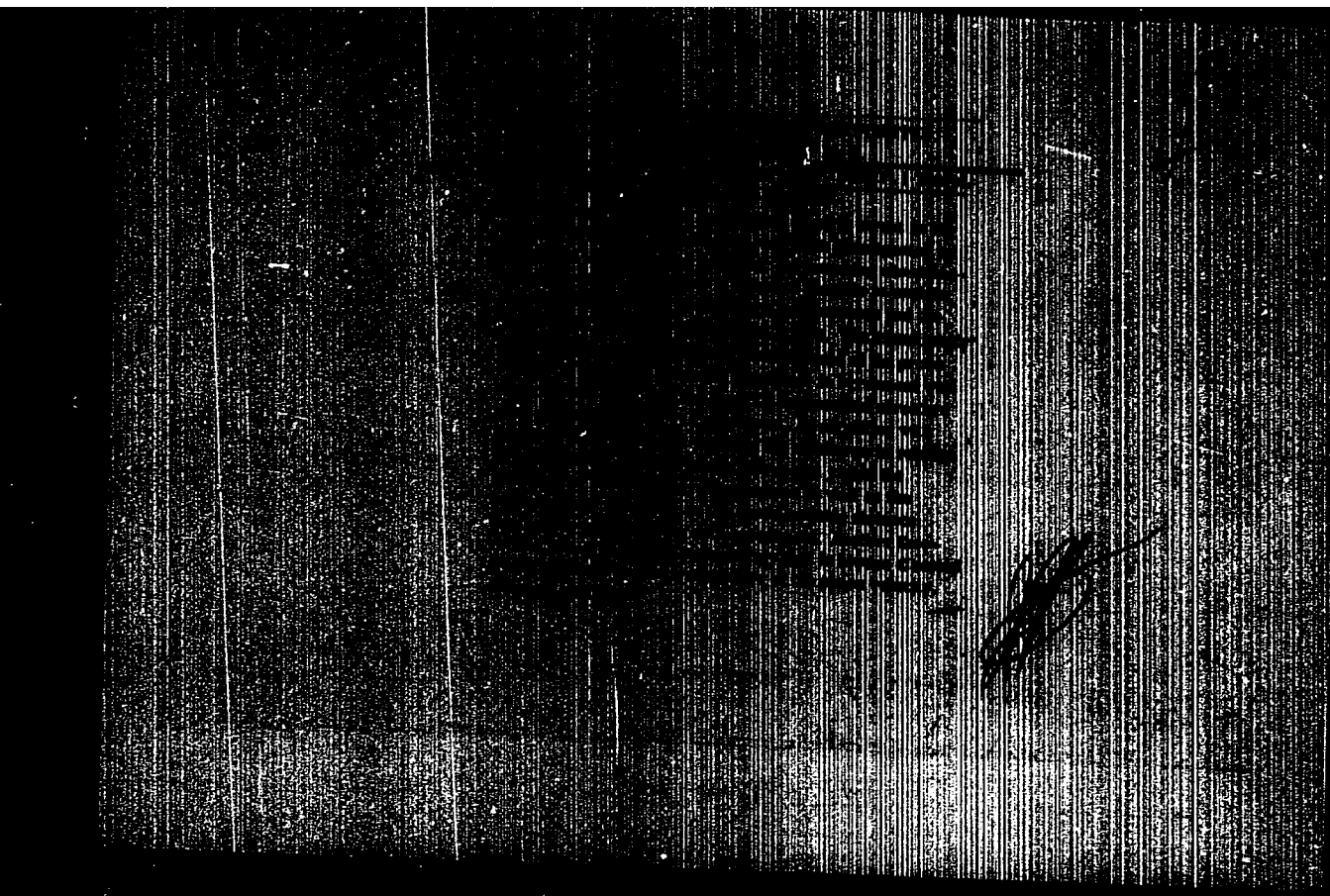
POTEMKIN, V.V.; GERTSENSHTEYN, M.Ye.

G.V.Gordeev's strata theory. Zhur.eksp. i teor.fiz. 24 no.5:610-612
My '53. (MLBA 7:10)

(Nuclear physics)

"APPROVED FOR RELEASE: 09/24/2001

CIA-RDP86-00513R000514920017-2

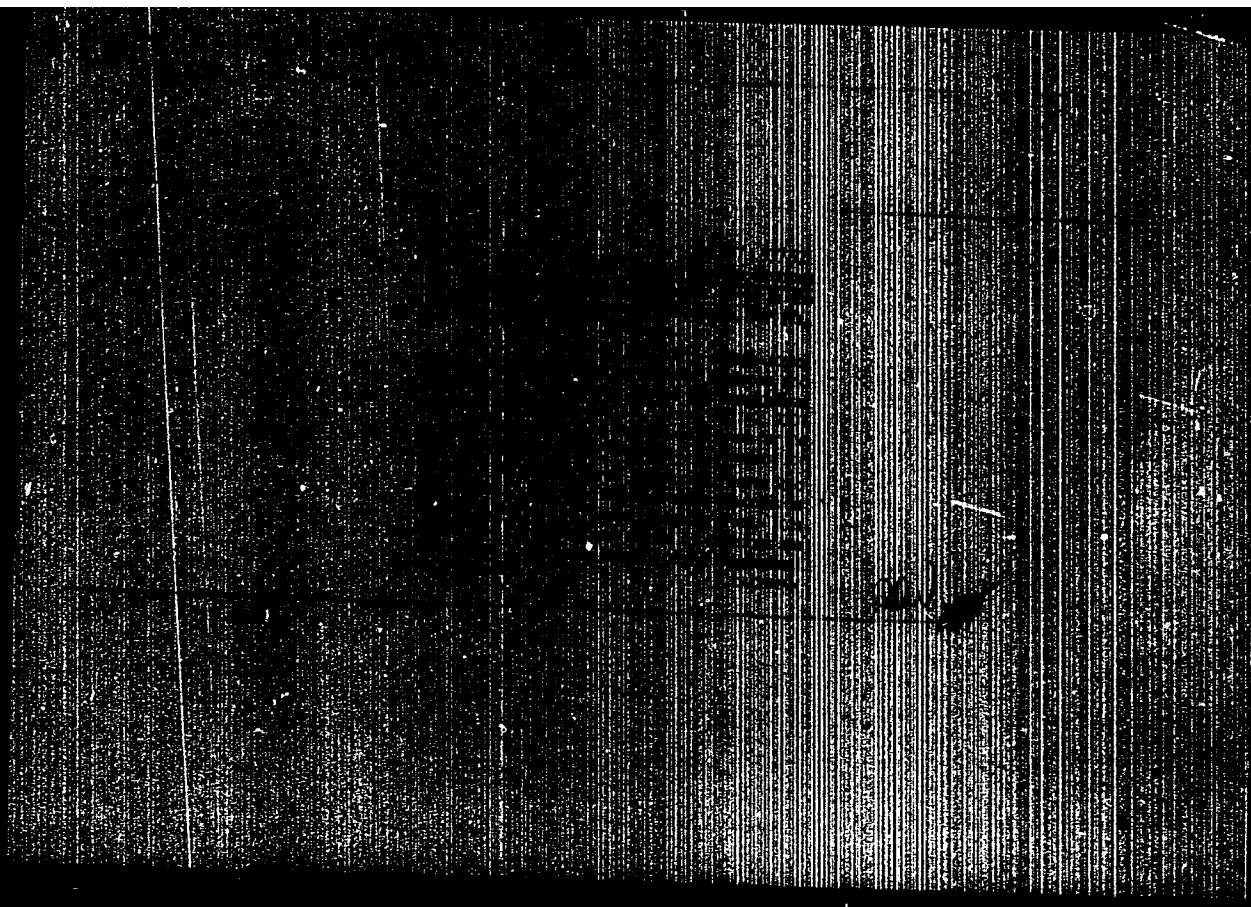


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APPROVED FOR RELEASE: 09/24/2001

CIA-RDP86-00513R000514920017-2"

GERTSENSHTEYN, M. Ye.
USSR/Physics - Self-excited oscillations

FD 405

Corn 1/1

Author : Gertsenshteyn, M. Ye.
Title : Self-excited oscillations in gaseous discharge at high pressures
Periodical : Zhur. eksp. i teor. fiz. 26, 54-63, Jan 1954
Abstract : Treats the interaction of sound waves and electron waves in gas-discharge plasma. Demonstrates the possibility of self-excited oscillations for a definite interval of frequencies. Thanks V. V. Potemkin for his judgment of the physical results. Fourteen references, including K. F. Teodorovich, avtokolebani'nyye sistemy (Self-excited oscillator systems), State Technical-Theoretical Literature Press, 1952.
Institution : Moscow State University
Submitted : November 1, 1951

GERTSENHTEYN, M. Ye.
USSR Physics - Electrodynamics

FD-119

Card 1/1 : Pub 146-3/10

Author : Gertsenshteyn, M. Ye.

Title : Energy current in spatial dispersing media

Periodical : Zhur. eksp. i teo. fiz., 26, 588-593, Jun. 1952.

Abstract : S. M. Rytov's results (ibid. 17, 930 (1947)) are generalized to the case of spatial dispersion when the partial derivative is not zero. It is shown that in this case the velocity of energy propagation coincides with the group velocity. + references. Indebted to V. V. Potemkin.

Institution : --

Submitted : October 15, 1952

GERTSENSHTEYN, M. Ye.
USSR/Physics - Plasma

FD-795

Card 1/1 Pub. 146-8/21

Author : Gertsenshteyn, M. Ye.

Title : Dielectric permeability of plasma located in a stationary magnetic field

Periodical : Zhur. eksp. i teor. fiz., 27, 180-183, Aug 1954

Abstract : The tensor of the complex dielectric permeability of an electron gas is computed taking into account the thermal motion of electrons. Indebted to V. V. Potemkin. Sixteen references, including 3 foreign

Institution : Central Scientific Research Institute of Radio Measurements

Submitted : October 15, 1953

GERTSENSHTEIN, M. YE.

Low-frequency oscillations in the positive column of a glow discharge. M. E. Gertsenshtein and V. V. Potemkin (Moscow State Univ.). *Sov. Radiotekhnika i Elektronika*, No. 27, 642-64 (1964).—It is assumed that the phase delay is caused by longitudinal electromagnetic waves propagated along the axis of the pos. column. The internal resistance of a discharge tube as a wave generator is of the order of several hundred ohms. An analysis of luminescent phenomena in the discharge shows that there is a connection between the waves and the current pulses; the periodic luminous structure disappears on lowering the pressure at a pressure p_{min} . An equiv. circuit is developed for the discharge tube acting as a pulse generator. The amplitude and the frequency of pulsation are changing periodically with the anode-cathode distance.

S. Pakswar

62

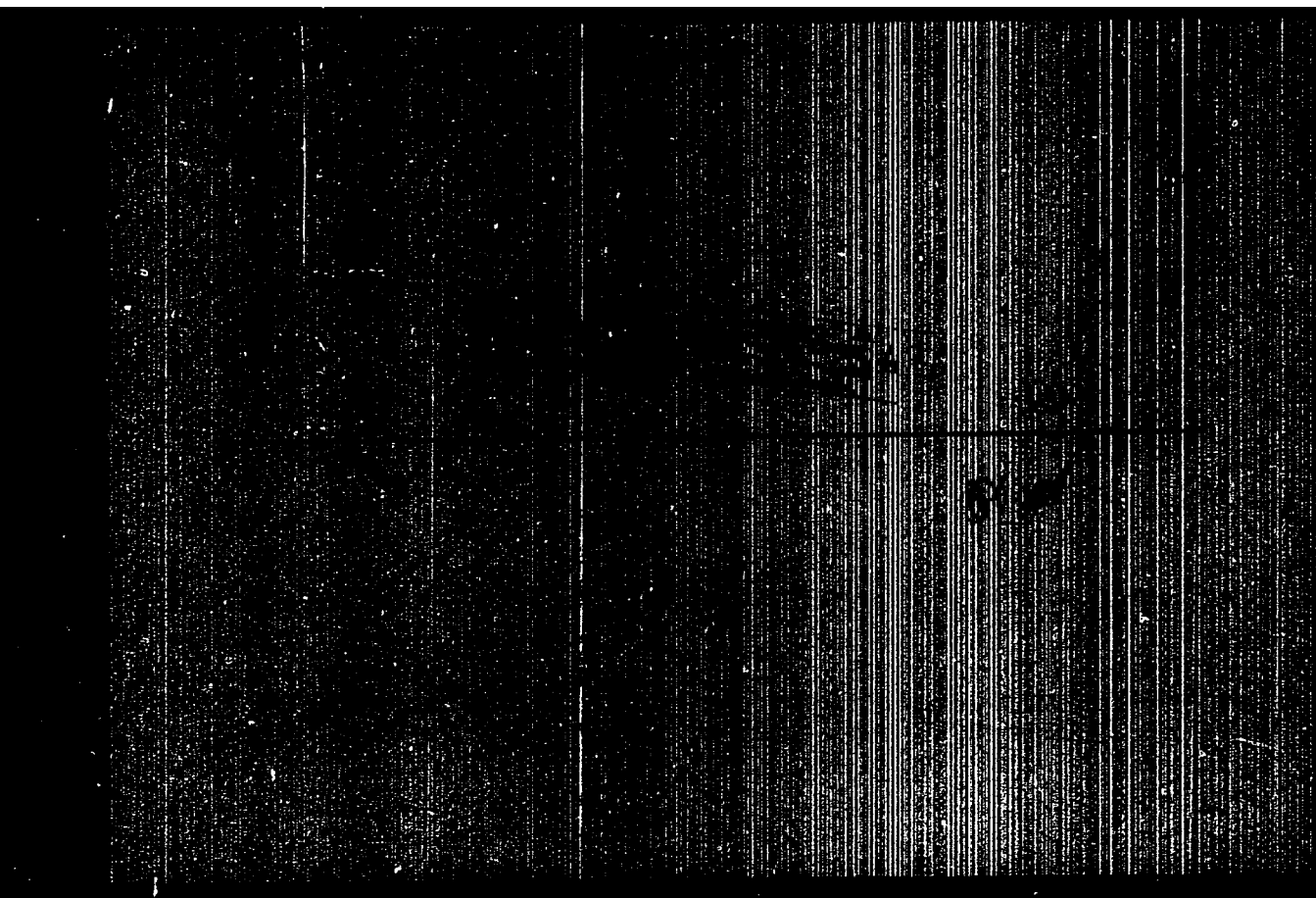
①

GERTSENHTEYN, M.Ye.

✓ Influence of elastic collisions of electrons and ions on longitudinal electric waves in plasma. M. B. Gertsenshtein (Moscow State Univ.). *Zhur. Eksp. i Teor. Fiz.* 6:27, 662-6 (1964).—A simplified form is developed for the collision integral. Two cases are discussed: (1) that when the phase velocity of the longitudinal wave is large compared to thermal velocity and (2) that when the phase velocity is small. In the 2nd case the losses are so small that a small quantity of energy will cause oscillations by autoexcitation. S. Pakising

"APPROVED FOR RELEASE: 09/24/2001

CIA-RDP86-00513R000514920017-2



APPROVED FOR RELEASE: 09/24/2001

CIA-RDP86-00513R000514920017-2"

GERTSENSHTEYN, M.Ye.

Correlation of fluctuations in electron gases. Zhur. tekhn. fiz. 25
no.5:834-840 May '55. (MLRA 8:7)
(Electrons)

GERTSENSHTEYN, M.Ye.; BRYANSKIY, L.N.

Attenuator errors due to disagreement in the path of superhigh
frequencies. Izv.tekh. no.1:28-33 Ja-F '56. (MLRA 9:5)
(Radio, Shortwave) (Wave guides)

GERTSENSTEYN, M.Ye.

Determining the shunting conductivity of the probe in recording
circuits. Izv.tekh. no.4:37-38 J1-Ag '56. (MLRA 9:11)
(Electric measurements)

GERTSENH'EYN, M.Ye.; BRYANSKIY, L.N.

Eliminating phase distortions in power measurements. Izv. tekh.
no.6:40-43 N-D '56. (MLRA 10:1)
(Electric measurements)

AUTHOR : Gertsenshteyn, M.E. and FOKRAS, A.M.

"Wave Guide Splitter with Variable Coupling,"
A-U Sci Conf dedicated to "Radio Day," Moscow, 20-25 May 1957.

PERIODICAL: Radiotekhnika i Elektronika, Vol. 2, No. 6, pp. 1221-1224,
1957, (USSR)

AUTHOR: Gertsenshteyn, V. Ye.

" Vol 18-56-1-17-17

TITLE: Precision Electronic Voltmeter for Relative Measurements
(Trazisionnyy lampovyy voltmetr dlya otноситel'nykh izme-
reniy)

ISSUANCE: Izmeritel'naya tekhnika, 1956, No. 4, pp. 71-73, 1000

ABSTRACT: Measurements of **audio frequency voltages** are in most cases relative: a signal of constant frequency and form is fed to the voltmeter and the relations of the amplitudes are measured. The linearity of the amplitude characteristic is, however, insufficient. The rectifying process of the a-c **voltage** is accompanied by non-linear distortions. A new voltmeter has been developed, therefore, the circuit diagram of which is shown in Figure 1. The kenotron (Ks) is used as a rectifying tube. The amplitude value of the sinusoidal **voltage** on the grid is 50 v. The measuring circuit for checking the linearity is given in Figure 2. The results of the measurements (e-

Card 1 of 2

01/01/86-0-09 17

Precision ~~Electronic~~ Voltmeter for relative Measurements

monstrated that the error in the section 0.25-100 divisions
does not exceed 0.2%.
There are 2 graphs, 2 diagrams and 4 references, 2 of which
are Soviet and 2 German.

Card 2 2

100-5-14/1

AUT. CR: Gertschikova, N.Ye. and Kryukov, L.N.

TITLE: Waveguide Phase-shifter Having a Low Reflection Coefficient
(Kludovodnyy fazosvobodnyy fazovraschitatel')

PERIODICAL: Radiotekhnika i Elektronika, 1958, Vol. II, No. 5,
pp 710 - 721 (USSR)

ABSTRACT: The standing wave ratio of a terminating load in a waveguide can be measured either by means of a movable probe, or by a fixed probe and a phase-shifter. The first method is not suitable for the measurement of small standing-wave ratios (SWR) since its accuracy is comparatively low. A higher accuracy can be achieved by employing the phase-shifter method; the equipment necessary for these measurements consists of (see Fig.1). 1) A ultra-high-frequency oscillator; 2) A matching transformer; 3) A fixed detector load; 4) A phase-shifter and, 5) the load. It is shown, however, that when measuring small reflections, the phase-shifter is subject to the following errors: 1) inaccuracies due to the losses in the phase-shifter; 2) reflections from the movable elements of the shifter; errors due to the mis-matching of the oscillator and the shifting section of the probe. The errors due to the reflections at the elements of the phase-shifter are analysed in detail. It is assumed that the phase-shifter consists of a

104-3-8-1-17

Waveguide Phase-Shifter Having a Low Reflection Coefficient

Dielectric plate whose thickness is s and height is h ; the permittivity of the material of the plate is ϵ and the plate is located in the xy plane. The fields are expressed by:

$$\frac{s}{h} \ll 1; \quad \frac{2\pi s}{\lambda} \ll 1; \quad \lambda = \frac{\lambda_0}{\sqrt{\epsilon}} \quad (8)$$

where λ_0 is the wavelength in free space. If it is assumed that the material of the plate is anisotropic, the boundary conditions at the plate can be written as Eq.(10) where E' and D' are the field and the electric induction in the plate. The analysis of the conditions in the system can be carried out by solving Eq.(11), in which A defines a vector potential. Solution of Eq.(11) is in the form of a series expressed by:

$$A(x, y, z) = \sum_n a_n(z) A_n^S(x, y) \quad (14)$$

where the amplitudes a_n can be obtained by solving a set of coupled differential equations, as expressed by Eqs.(15), in which ϵ_m is given by Eq.(10). Eq.(15) can be solved by the

method of successive approximations and in the first approximation

109-3-6-1-1/17

Waveguide Phase-shifter Having a Low Reflection Coefficient

they can be expressed in the form of Eqs.(19). Solution of Eqs.(19) is in the form of Eqs.(20) and (21) where $q(x)$ is the phase. On the basis of the above equations, it is shown that the phase shift produced by the shifter can be expressed by:

$$\theta = \frac{1}{ab} \frac{\epsilon - 1}{\sqrt{1 - \omega_c^2/c^2}} \frac{\omega}{c} \sin^2 \frac{\pi x}{a} \int_{-\infty}^{+\infty} \ln ds \quad (27)$$

where a and b are the dimensions of the waveguide and x is the distance between the plate of the phase-shifter and the narrow wall of the guide. The reflection coefficient of the phase-shifter can be expressed by:

$$R = \frac{1}{ab} \sin^2 \frac{\pi x}{a} \left(\frac{\omega}{c} \right) \left(\frac{\epsilon - 1}{\sqrt{1 - \omega_c^2/c^2}} \right) \int_{-\infty}^{+\infty} \ln ds e^{-2i\theta} \quad (28)$$

which, for a symmetrical plate, is in the form of Eq.(19). Eqs.(27) and (28) can be regarded as the basic formulae for

Card 3/-

100-3-5-14/15

Waveguide Phase-shifter Having a Low Reflection Coefficient

the design of a phase-shifter. It is shown that the error of measurement of the reflection coefficient of the load $\delta \bar{\Gamma}_H$ is related to the reflection coefficient of the phase-shifter, $\bar{\Gamma}_Q$, by means of Eq.(30). From this, it follows that the worst conditions (maximum error) are expressed by:

$$\delta \bar{\Gamma}_H = \frac{\sqrt{2}}{2} \bar{\Gamma}_Q = 0.707 \bar{\Gamma}_Q \quad (31).$$

The reflection coefficient of the phase-shifter can be measured experimentally by means of the equipment shown in Fig.3; this consists of a fixed detector load, an auxiliary phase-shifter, the investigated phase-shifter, a matching transformer and a terminating load. Eq.(28) can be used to design a phase-shifter and, for this purpose, it is transformed into Eq.(32), in which $\bar{\Gamma}_Q$ is given by E.(31). In this equation, $(1.5)_0$

denotes the transverse dimension of the phase-shifter plate at its largest cross-section (in the center). Eq.(32) shows that the $\bar{\Gamma}_Q$ has satisfactory values of the phase-shifting plate is that given by E.(40), where α is a parameter.

0.04/5 For this value, the reflection coefficient of the shifter is

Waveguide Phase-shifter Having a Low Reflection Coefficient

109-3-5-14/11

the form of Eq.(41). An experimental phase-shifter, described in Eq.(41), was constructed and it was found that its reflection coefficient was so low that it could not be measured by means of a measuring line. It was found by employing the method of Fig.5 that the standing wave ratio was better than 1.00%. There are 6 figures and 12 references, 9 of which are Soviet and 3 English.

ASSOCIATION: Vsesoyuznyy nauchno-issledovatskiy institut fiziko-tekhnicheskikh i radioelektricheskikh izmereniy (All-Union Scientific Research Institute for Physico-engineering and Radio-engineering Measurements)

SUBMITTED: July 30, 1956

AVAILABLE: Library of Congress

Card 5/5

1. Wave ratio-Measurement 2. Phase shifter-Applications

AUTHOR: Gertsenshteyn, M. Ye.

01/10-3-10-3/1

TITLE: Spatial Beats of Noise Waves in Coupled Delay Devices (Lines) (Prostranstvennyye shumovyykh voln v svyazannykh zamedlitel'nykh)

PERIODICAL: Radiotekhnika i Elektronika, 1987, Vol 3, No 10, pp 1254 - 1263 (USSR)

ABSTRACT: The investigation of ^{the} complex problems of wave propagation in electron beams or in electron gas can be approximately treated as a problem of formal electrodynamics, provided the fundamental equations contain a permittivity operator $\hat{\epsilon}$ for the electron gas. The Maxwell equations are therefore written in the form of Eqs.(1) where \mathbf{j} and ρ are the currents and charges which excite the system. The permittivity is a function of frequency ω and of the wave number \mathbf{k} , i.e:

$$\hat{\epsilon} = \hat{\epsilon}(\omega, \mathbf{k}) \quad (2)$$

where the sign on top denotes an operator. To obtain the electrodynamic equations, a number of simplifications; firstly, the system (electron gas and the electromagnetic field) have a large number of the degrees of

Card1/6

Spatial Beams of Noise Waves in Coupled Delay Devices (Il'inskiy)

UDC/ISSN-3-10-3/12

freedom; secondly, the meaning of j and ρ is not clear and the sources of noise are not taken into account. It is therefore necessary to consider the following kinetic equation for the distribution function f :

$$\frac{\partial f}{\partial t} + v \frac{\partial f}{\partial r} + \frac{e}{m} \left\{ E + \left[\frac{v}{c} H \right] \right\} \frac{\partial f}{\partial v} = 0 \quad (3).$$

The electromagnetic fields have to satisfy the equation system (4). The oscillatory component of the distribution function ϕ is expressed by Eq.(5), where \hat{L} is a linear operator, as defined by Eq.(3). From the theory of linear, differential equations (Ref 6), it follows that the solution of Eq.(5) in a fixed region of space can be represented as Eq.(7), where ϕ_{sv} corresponds to free oscillations and is independent of the field, ϕ_{vyn} is analogous to the forced oscillations and proportional to the right-hand side of Eq.(5).

Card2/6

Generalized Theory of Noise in Cavity Devices (11-12)

Consequently, the second component of Eq. (8) is the boundary conditions given by Eq. (9), which describes the motion of electrons under the influence of the external components of the electromagnetic field. The solution of Eq. (8) can be written as Eq. (9), where \hat{G} is the Green function of Eq. (5). The statistical components of the charges and currents can be expressed in Eq. (11), so that the component j_{vyn} can be linearly expressed by the field E_{v} , as shown in Eq. (12). The operator \hat{G} is given by Eq. (13). The shot noise in electron beams can be evaluated on the basis of the distribution function given by Eq. (15), in which r_i and v_i are the radius vector and velocity of the i -th electron. On the other hand, the component of the distribution function expressed by Eq. (3), which describes the noise, is expressed by Eq. (16). Consequently, the function ψ_{sh} can be expressed by analogy with Eq. (7), as a sum of two components (Eq. (17)). The current and the charge noise can be expressed by Eqs. (18), where j_1 is the noise current and q_1 is the noise charge.

6-103/6

SCV/10-2-10-7/10
 Control of Wave in Coupled Delay Devices (11/68)

electron. On the basis of the above analysis, it is concluded that an arbitrary linear system can be described by the following equations of the electron dynamics:

$$\begin{aligned} \text{rot } H &= \frac{i\omega}{c} \hat{\epsilon} E + \frac{4\pi}{c} (j_A + j_{sv} + j_{sh}) ; \\ \text{rot } E &= - \frac{i\omega}{c} H ; \\ \text{div } \hat{\epsilon} E &= 4\pi (\rho_A + \rho_{sv} + \rho_{sh}) ; \end{aligned} \quad (18)$$

$$\text{div } H = 0 ,$$

where j_A and ρ_A are the currents and charges in the antennas which excite the system. The field E is the normal wave (on the basis of Eqs.(18)) satisfying the condition k_n is the propagation constant for the n-th wave.

02064/6

11/11/56-11-11/56
Spatial Beats of Noise Waves in Coupled Delay Devices (lines)

There are 17 references, 15 of which are Soviet, 1 English and 1 German; three of the Soviet references are translated from English.

ASSOCIATION: Vsesoyuznyy n.-i in-t fiziko-tekhnicheskikh i
radiotekhnicheskikh izobreteniy (All-Union Scientific
Research Institute of Physico-technical and
Radio-engineering Measurements)

SUBMITTED: July 30, 1956

Card 6/6

1. Delay lines--Theory 2. Electromagnetic fields--Mathematical
analysis

6(4), 7(7)

UDC 621.372.13.02-3/12

AUTHORS: Gertsenshteyn, M. Ye., Pokras, A. M., Solov'ev, L. G.

TITLE: Multi-Channel System of Parallel Selection Waveguides with Variable Couplings (Mnogostvol'naya sistema parallel'noy selektsii s reguliruyemyimi svyazjami)

PERIODICAL: Radiotekhnika, 1958, Vol 13, Nr 12, pp 20-25 (USSR)

ABSTRACT: With relatively narrow bands or not too high claims with respect to the adaptation, the problem of dividing or joining the channels can be solved by means of a system of shunted series-resonance circuits. The various filters are connected, in parallel to each other, to the common conductor by a simple or compact tap. A simple method of setting up a tap for the shunted series-resonance circuits is given. This method is based on the calculation data without intricate experimental work. At first, the paralleling of the resonance circuits is investigated. The obtained formulae (3) and (5) show that the tap must be tuned jointly with the filter connected to it, with one element. The input resistance of filters with several elements is then investigated and it is shown that the mutual influence of the various channels is determined essentially by the input resona-

Card 1/2

U.S. 108-13-12-3/12

Multi-Channel System of Parallel Selection Waveguides with
Variable Couplings

tors. Therefore, the input resonators of the filters with several elements must also be tuned with the taps. The connection of the filters to the common line is then investigated. The connection to the main waveguide is made variable by means of screws with a steplike cross section. By means of the method given in this article, a simple waveguide tap is worked out for a system with shunted series-resonance circuits with an input transient wave factor of ≈ 0.95 in the middle of the band. There are 7 figures, 1 table, and 3 Soviet references.

SUBMITTED: June 1, 1957

Card 2/2

GERTSENSHTEYN, M. YE.

56-1-55/56

AUTHORS: Bonch-Bruyevich, V. L. , Gertsenshteyn, M. Ye.

TITLE: On the Theory of the Magnetic Susceptibility of Metals (K teorii magnitnoy vospriimchivosti metallov)

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1958, Vol. 34, Nr 1, pp. 261 - 261 (USSR)

ABSTRACT: The magnetic susceptibility of the electron gas was recently (references 1, 2, 3) calculated with the taking into account of the distant Coulomb correlation. In this connection, however, only the susceptibility caused by the Fermi branch of the spectrum of excitations was taken into account. But the authors want to call attention to the fact that the Bose quanta of plasma vibrations also furnish a certain contribution to the susceptibility. It is true that these excitations are neutral and do not furnish any contribution to the current, but their energy depends on the field strength of the magnetic field H and therefore the plasma-quanta are "carriers of magnetism". At the usual temperatures the real plasma-quanta are practically not excited in metal, but their zero energy also depends on H . This leads, as shown here, to a plasma-diamagnetism comparable with the Landau diamagnetism. In a weak magnetic field a separation of the plasma vibrations in longitu-

Card 1/2

56-1-55/56

On the Theory of the Magnetic Susceptibility of Metals

dinal and transversal vibrations is also possible. For the case discussed here only the former are of interest. An expression for the frequency of the longitudinal plasma-quantum is given. Then the author gives an expression for the magnetic susceptibility caused by the dependence of the zero energy of the plasma on the magnetic field. The neglect of the zero energy of the plasma is generally not at all justified and the quantitative agreement of the theory by Pines (reference 1) with the experiment must anew be checked. There are 5 references, 2 of which are Slavic.

ASSOCIATION: **Moscow State University**
(Moskovskiy gosudarstvennyy universitet)

SUBMITTED: November 21, 1957

AVAILABLE: Library of Congress

Card 2/2

GERTSEN, S. I. Y. N. V. Y. E.

<p>В. И. Курин Шероховатость и шероховатость поверхности бочек</p> <p>В. А. Герман 1) измерение давления в реакционной камере камере и в газовой среде</p> <p>10 июня (с 18 до 22 часов)</p> <p>Г. И. Уткин Интерференционные явления в оптических системах: влияние температуры, неоднородности среды на качество изображения</p> <p>Г. И. Козловский К теории радиосвязи в атмосфере</p> <p>М. Е. Герасимович В. Е. Косилов Физические основы и математические методы теории радиосвязи</p> <p>В. П. Давид О радиосвязи в атмосфере и в космосе с учетом р- и н-волн</p> <p>21</p>	<p>Г. И. Козловский О радиосвязи в атмосфере и в космосе с учетом р- и н-волн</p> <p>11 июня (с 10 до 15 часов)</p> <p>А. И. Козловский Новые методы контроля качества и контроля качества продукции</p> <p>М. Е. Герасимович В. А. Косилов Математические основы теории</p> <p>В. П. Давид Об основах теории радиосвязи в атмосфере с учетом р- и н-волн</p> <p>В. А. Косилов О радиосвязи в атмосфере и в космосе с учетом р- и н-волн</p> <p>11 июня (с 18 до 22 часов)</p> <p>62</p>
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report submitted for the Centennial Meeting of the Scientific Technological Society of
 Radio Engineering and Electrical Communications in A. S. Popov (VRHE), Moscow,
 6-12 June, 1959

AUTHOR: Gertsenshteyn, M.Ye.

SC7/1009-4-1-27/50

TITLE Noise in an Electron Beam (O shumskii elektronnogo puchka)

PERIODICAL: Radiotekhnika i Elektronika, 1964, Vol 4, Nr 1,
pp 146 - 147 (USSR)

ABSTRACT An electron beam contains two types of noise; one of these can be referred to as the cathode noise and is due to the emission processes at the cathode which produces the beam. The second type of noise can be referred to as the volume noise and is due to the processes occurring in the electron beam itself. In the vicinity of the cathode, the cathode noise is predominant while the volume noise is comparatively low. It can be expected that at large distances from the cathode, the volume noise will become significant, while the cathode noise is negligible. It is shown that the conditions for the predominance of the volume noise can be expressed by.

$$\gamma \geq 0.3 - 0.4 \quad (6)$$

$$\omega_0 \tau \geq 0.2 - 0.5 \quad (7)$$

CU111/2

Noise in an Electron Beam

307/109-4-1-27/30

where ξ is given by Eq (5), γ is the transit time for the drift space and ω_c is the Langmuir frequency.

In Eq (5), u_0 is the electron beam velocity, v_0 is the thermal electron velocity and ω is the operating frequency.

There are 3 references, 2 of which are Soviet and 1 English.

SUBMITTED. February 21, 1958

Card 2/2

16(1),16(2)

AUTHORS: Gertsenshteyn, M. Ye., and Vasil'yev, V. B. 05793
307/52-4-4 4/13

TITLE: Waveguide With the Random Inhomogeneities and Brownian Motion
on the Lobachevskiy Plane

PERIODICAL: Teoriya veroyatnostey i yeye primeneniya 1958,
Vol 4, Nr 4, pp 424-432 (USSR)

ABSTRACT: The authors consider a waveguide with random inhomogeneities. Let r_1 be the reflection coefficient (ratio of the amplitudes of the reflected and original wave) of a single inhomogeneity. Let all r_1 be independent random functions with known statistical characteristics. The authors ask for the reflection coefficient of the whole waveguide. It is shown that the problem can be reduced to the Brownian motion in the Lobachevskiy plane. At first two inhomogeneities are considered and it is stated that the resulting reflection coefficient is a bijective linear function mapping the unit circle onto itself. Therewith the relation with the Lobachevskiy plane is given. For several inhomogeneities the image point moves in the Lobachevskiy plane, while the sum of the corresponding nonEuclidean distances yields the total effect of the inhomogeneities. If the considered random process is continuous, then it leads to the diffusion equations in the Lobachevskiy plane.

SUBMITTED: December 25, 1958
Card 1/1

AUTHORS: Gertsenshteyn, M.Ye. and Vasil'yev, V.B. SOV/109-4-4-7/24
 TITLE: The Diffusion Equation of a Statistically Non-homogeneous Waveguide (Diffuzionnoye uravneniye dlya statisticheski neodnorodnogo volnovoda)
 PERIODICAL: Radiotekhnika i elektronika, 1959, Vol 4, Nr 4, pp 611 - 617 (USSR)
 ABSTRACT: It is assumed that the complex reflection coefficient of the system is $r = x + iy$ and that its probability density distribution satisfies the diffusion equation:

$$D \left(\frac{\partial^2 W}{\partial x^2} + \frac{\partial^2 W}{\partial y^2} \right) = \frac{\partial W}{\partial z} \quad (3)$$

where D is the statistical characteristic of the waveguide; this is equal to the average half sum of the reflection coefficients squared per unit length of the waveguide; z is the distance along the length of the waveguide. If a normalised variable $t = \int D dz$ is introduced. the equation can be written as Eq (4). When the waveguide

Card1/4

SOV/107-1-4-7/24

The Diffusion Equation of a Statistically Non-homogeneous Waveguide

is terminated with a matched load, the solution of Eq (4) is in the form of Eq (5). It is seen that for large t , Eq (5) has no physical meaning. A different differential equation for the density probability function is, therefore, necessary. The equation should be such as to make the solution independent of the terminating load: also when $x^2 + y^2 \rightarrow 0$, the differential equation should coincide with Eq (4). These requirements are satisfied by:

$$\Delta W = - \frac{\partial W}{\partial t} \quad (7)$$

where Δ is the Laplace operator on the Lobachevskiy surface. The operator is defined by Eq (8). By introducing a polar system of co-ordinates η, φ , as defined by Eqs (9), the Laplace operator is represented by Eq (10). If $\eta = i\theta$ and $u = \operatorname{ch} \eta$, Eq (10) can be expressed as Eq (11). This can be solved by introducing the Laplace transformations and leads to the Legendre equation which

Card2/4

SOV/109-4-4-7/24

The Diffusion Equation of a Statistically Non-homogeneous Waveguide

is in the form of Eq (13). In its final form, Eq (13) can be written as Eq (16). On the basis of the above, it is found that the average value for u is expressed by Eq (17). The average value of the reflection coefficient is approximately expressed by Eq (19). The value of the average reflection coefficient r as a function of t is plotted in Figure 2; Curve I corresponds to a linear approximation, while Curve II represents more accurate results. It is seen that Curve I gives values which are higher than those represented by Curve II. The physical meaning of this is that a part of the energy of the reflected wave travelling from the load towards the generator is reflected by the non-uniformities of the waveguide (towards the terminating load). The authors make acknowledgment to B.Ye. Kinber for discussing the work and for his valuable remarks.

Card 3/4

SOV/102-4-4-7/24

The Diffusion Equation of a Statistically Non-homogeneous Waveguide

There are 2 figures and 9 references, 1 of which is English
and 8 Soviet. 1 of the Soviet references is translated
from English.

SUBMITTED: November 26, 1957

Card 4/4

Possibility of Measurement Failure of Gravimetric, Distillation and Refractive Coefficients

1. *Journal of the American Medical Association*, 1990; 263: 1025-1026.

[illegible]

... ..

The effect of the two types of information on the choice of the best alternative is shown in Figure 1. In the case of the two types of information, the best alternative is the one with the highest expected utility. In the case of the two types of information, the best alternative is the one with the highest expected utility.

1. 1. 1.

[illegible]

Choi et al.

Possibility of Measuring the Velocity of
Gravitational Distribution under Laboratory
Conditions

77014
SOV/55-37-6-54/01

gravity. There is a Soviet reference.

SUBMITTED: July 29, 1954

Card 3/3

GERTSENSTEYN, M. Ye.; BRYANSKIY, L.N.

Using phase shifters for eliminating mismatch errors. Izv.tekh.
no.1:48-51 Ja '60. (MIRA 1):5)
(Phase converters)

[illegible]

$\epsilon \in [0, \mu]$

Ε μ

rot H = $\frac{1}{2} D \frac{1}{2} j$.

1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26

$$\text{rot } E = \frac{1}{c} \dot{B} \quad (4)$$

Concerning Electrochromic and Redox
Controlled A Glycerol: Methyl Wine
Variable Parameters

$$\mathbf{D} = \varepsilon(t) \mathbf{E}, \quad (5)$$

$$\mathbf{B} = -\mu(t) \mathbf{H}, \quad (1)$$

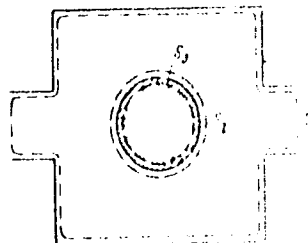
E and **H** are weak at equilibrium. The first two terms in (1) represent pumping field E and the second two terms represent the response on time. Here, $\langle \hat{E}_1 \rangle$ and $\langle \hat{E}_2 \rangle$ are the average of E at origin:

$$-\frac{c}{4\pi} \operatorname{div}[\mathbf{E}\mathbf{H}] = \frac{1}{8\pi} \frac{d}{dt} ((\mathbf{E}, \mathbf{E}) + (\mathbf{H}, \mathbf{H})) - \frac{1}{4\pi} (\mathbf{E}, \mathbf{E}) - (\mathbf{H}, \mathbf{H}) \quad (6)$$

While on the Internet, the researcher can find a wide range of information and resources that are not available in traditional print sources. The Internet is a vast and ever-growing source of information, and it can be used to find a wide range of resources, including:

1. *Chlorophyll a* and *Chlorophyll b* were determined by the method of Arar and Collins (1971) using a Shimadzu 1010 spectrophotometer. The concentration of chlorophyll was expressed in $\mu\text{g mL}^{-1}$ of the sample.

1. The surface of the body is divided into two parts: the surface of the body and the surface of the body.



The surface of the body is divided into two parts: the surface of the body and the surface of the body. The surface of the body is divided into two parts: the surface of the body and the surface of the body. (S₁) and (S₂) are the surfaces of the body. (S₁) and (S₂) are the surfaces of the body. (S₁) and (S₂) are the surfaces of the body. (S₁) and (S₂) are the surfaces of the body.

$$P_1 = \int_{S_1} \mathbf{E} \cdot \mathbf{dS}$$

$$P_2 = \int_{S_2} \mathbf{E} \cdot \mathbf{dS}$$

Concerning: Electrodynamics of a medium with a time-varying permittivity and permeability. A Homotropic Medium With Time-Varying Permittivity and Permeability Parameters

and substitute into (1) and (2) the following:

$$P_1 - P_2 = \frac{d}{dt} \frac{1}{8\pi} \int_V (\epsilon E, E) + (\mu H, H) dv + \frac{1}{8\pi} \int_V \frac{d}{dt} (\epsilon E, E) + (\mu H, H) dv \quad (3)$$

The above is valid for a medium with a time-varying permittivity and permeability. While (1) contains the equations for E and H which are unknown to us, Eq. (3) can be considered as an approximate solution of the field structure. Relations similar to (3) can be obtained for constant, time-varying, and self-excited systems with self-excitation. (4) A study of the properties of normal waves in a medium with a time-varying permittivity and permeability. The authors consider the case of a resonator partially or totally filled with a reactive substance where $\epsilon = \epsilon(\omega) = \mu = \mu(\omega)$. The average value of the permittivity and permeability is independent of the time.

Consider a dielectric medium of volume V in which a time-varying electric field $E(t)$ is applied. The electric field is assumed to be of the form

$$E = E^0 + E_1(t), \quad (10)$$

$$\mu = \mu^0 + \mu_1(t).$$

The dielectric medium is assumed to be isotropic and homogeneous. The electric field is assumed to be of the form

$$E = \sum_i a_i(t) E_i(r),$$

$$H = \sum_i b_i(t) H_i(r). \quad (11)$$

A system of ordinary differential equations for the coefficients $a_i(t)$, $b_i(t)$ is obtained by substituting Eqs. (10) and (11) into Eq. (1.1):

$$\text{rot } E_i = -\frac{1}{c} \frac{da_i}{dt} H_i, \quad (12)$$

$$\text{rot } H_i = \frac{1}{c} \omega_i \epsilon_i E_i.$$

and $\omega_i = 1/T_i$

[illegible]

where \mathbf{j}^2 and \mathbf{j} are defined by Eqs. (1) and (2), respectively; \mathbf{E}_0 is the vector of the electric field of the wave; \mathbf{E} is the vector of the electric field of the electron beam; \mathbf{B} is the vector of the magnetic field of the wave.

$$i\hbar \partial_t \psi_1 = \hat{H}_1 \psi_1 = \sum_n \frac{\hbar^2}{2m} |\nabla_n|^2 \psi_1 = \hat{H}_1 \psi_1$$

$$ia_{\ell}e_{\ell} = i_{\ell} = \sum_{j \in \mathbb{Z}} i_{\ell,j}e_j = n_{\ell}.$$

to the first two terms of the expansion of the function $f(x)$ in the neighborhood of the point $x = 0$. The function $f(x)$ is assumed to be analytic at $x = 0$.

where

$$\begin{aligned} \varphi_1(0) &= \frac{1}{2} (E_{11}(0) + E_{22}(0) - E_{33}(0)), \\ \varphi_2(0) &= \frac{1}{2} (E_{11}(0) - E_{22}(0) + E_{33}(0)). \end{aligned}$$

The first two terms of the expansion of the function $f(x)$ in the neighborhood of the point $x = 0$ are given by the expressions (17) and (18). The function $f(x)$ is assumed to be analytic at $x = 0$. The function $f(x)$ is assumed to be analytic at $x = 0$. The function $f(x)$ is assumed to be analytic at $x = 0$.

$$\begin{aligned} \varphi_1(0) &= \frac{d}{dx} \left\{ (1-x)^{-\frac{1}{2}} \left[E_{11}(x) + E_{22}(x) - E_{33}(x) \right] \right\} \Big|_{x=0}, \\ \varphi_2(0) &= \frac{d}{dx} \left\{ (1-x)^{-\frac{1}{2}} \left[E_{11}(x) - E_{22}(x) + E_{33}(x) \right] \right\} \Big|_{x=0}. \end{aligned} \quad (17)$$

where

Concerning Electrodynamics of a Medium
Containing a Gyrotropic Medium With
Variable Parameters

In a similar way, keeping in mind that the system (1) can be transformed into two equations with respect to a_q and b_q only, (1) can be reduced to a system of normal waves in presence of a gyrotropic medium $\epsilon = \epsilon(\omega, t)$, $\mu = \mu(\omega, t)$ and $\Omega = \Omega(t)$. If the medium is time-periodic, then we can write

$$\epsilon_q(\omega, t) = \sum_{n=-\infty}^{+\infty} \epsilon_{qn}(\omega) e^{in\Omega t},$$

for

$$\mu_q(\omega, t) = \sum_{n=-\infty}^{+\infty} \mu_{qn}(\omega) e^{in\Omega t}.$$

Remembering that $\epsilon = \epsilon(\omega, t)$, $\mu = \mu(\omega, t)$ and

we can write the system (1) in the form

where $\epsilon(\omega)$, $\mu(\omega)$ and Ω are the Fourier components of the corresponding quantities.

Thus, if the

medium is time-periodic, then we can write

Consider the electric field \mathbf{E} and magnetic field \mathbf{H} in a medium with permittivity ϵ and permeability μ . The fields are assumed to be time-harmonic with angular frequency ω . The electric field \mathbf{E} and magnetic field \mathbf{H} are related by the following equations:

$$\begin{aligned} \nabla \times \mathbf{E} &= -\frac{1}{c} \frac{\partial \mathbf{B}}{\partial t} \\ \nabla \times \mathbf{H} &= \frac{1}{c} \frac{\partial \mathbf{E}}{\partial t} + \mathbf{J} \end{aligned}$$

$$\begin{aligned} \mathbf{E} &= \sum_n \mathbf{E}_n e^{i\omega_n t} \\ \mathbf{H} &= \sum_n \mathbf{H}_n e^{i\omega_n t} \end{aligned} \quad (10)$$

where \mathbf{E}_n and \mathbf{H}_n are the Fourier components of the fields.

$$\text{div}[\mathbf{E}\mathbf{H}^*] = \frac{1}{c} \sum_n \sum_m \omega_n (\mathbf{E}_n \cdot \mathbf{H}_m^* - \mathbf{H}_n \cdot \mathbf{E}_m^*)$$

where $\mathbf{E}_n \cdot \mathbf{H}_m^* = \mathbf{E}_n \cdot \mathbf{H}_m^*$ and $\mathbf{H}_n \cdot \mathbf{E}_m^* = \mathbf{H}_n \cdot \mathbf{E}_m^*$. The first term on the right-hand side of (10) is zero because of the orthogonality of the Fourier components.

Thus, we have

Nonresonant Electrodynamics of a Plasma
 Ionosphere A Generalized Model of the
 Ionospheric Perturbation

$$\begin{aligned} i \sum_j b_j \omega_j Q_j^{(0)}(\omega) &= \sum_j b_j Q_j^{(0)}(\omega) + \sum_j \sum_{l=1}^{\infty} \frac{b_j}{l} \omega_j^l Q_j^{(l)}(\omega) \\ i \sum_j a_j \omega_j Q_j^{(m)}(\omega) &= \sum_j b_j Q_j^{(m)}(\omega) + \sum_j \sum_{l=1}^{\infty} \frac{b_j}{l} Q_j^{(l)}(\omega) P_l \end{aligned} \quad (19)$$

Here, φ_{ij} and ψ_{ij} are the coefficients of the expansion of the wave function ψ in the basis of the eigenfunctions of the unperturbed system. The frequency ω of the perturbation is assumed to be real. The terms $Q_j^{(l)}$ are the l -th order harmonics of the perturbation. The coefficients a_j and b_j are the components of the vector \mathbf{a} and \mathbf{b} respectively. The coefficients P_l are the components of the vector \mathbf{P} . The coefficients δ_{ij} are the components of the matrix δ . The coefficients ϵ_{ij} are the components of the matrix ϵ . The coefficients η_{ij} are the components of the matrix η . The coefficients θ_{ij} are the components of the matrix θ . The coefficients ϕ_{ij} are the components of the matrix ϕ . The coefficients χ_{ij} are the components of the matrix χ . The coefficients ψ_{ij} are the components of the matrix ψ . The coefficients ω_{ij} are the components of the matrix ω . The coefficients φ_{ij} are the components of the matrix φ . The coefficients ρ_{ij} are the components of the matrix ρ . The coefficients σ_{ij} are the components of the matrix σ . The coefficients τ_{ij} are the components of the matrix τ . The coefficients υ_{ij} are the components of the matrix υ . The coefficients ϕ_{ij} are the components of the matrix ϕ . The coefficients χ_{ij} are the components of the matrix χ . The coefficients ψ_{ij} are the components of the matrix ψ . The coefficients ω_{ij} are the components of the matrix ω . The coefficients φ_{ij} are the components of the matrix φ . The coefficients ρ_{ij} are the components of the matrix ρ . The coefficients σ_{ij} are the components of the matrix σ . The coefficients τ_{ij} are the components of the matrix τ . The coefficients υ_{ij} are the components of the matrix υ .

1. The first part of the paper is devoted to the study of the asymptotic behavior of the solutions of the system (1) as $\epsilon \rightarrow 0$. It is shown that the solutions of the system (1) converge to the solutions of the system (2) in the sense of the L^2 -norm. The convergence is proved by the method of asymptotic expansion.

$$\Psi: \quad \Pi = -\operatorname{grad} \Psi$$

Journal of Management Studies, 20(6), 791-806.

$$-\operatorname{div} g \operatorname{grad} U = \frac{1}{2} \frac{\partial^2 U}{\partial t^2} - \frac{1}{2} \frac{\partial^2 U}{\partial x^2} - \frac{1}{2} \frac{\partial^2 U}{\partial y^2} = 0, \quad (2.1)$$

$$\frac{\partial^2 \Gamma}{\partial \sigma^2} + (1+k) \left(\frac{\partial^2 \Gamma}{\partial \sigma \partial \tau} - \frac{\partial^2 \Gamma}{\partial \sigma^2} \right) = 0 \quad (10)$$

10. *Journal of the American Medical Association*, 1990; 263: 1033-1036.

1. James Earl Ray, born May 1928, Alton, Illinois
 2. convicted murderer of Martin Luther King
 3. President Lyndon B. Johnson

[illegible]

1. *Chlorophyll a* and *Chlorophyll b* were determined by the method of Lichtenthal and Whistler (1973). The total chlorophyll content was determined by the method of Arar and Cook (1977).

E. coli

9.4600,9.2180

77772
SOV/109-5-2-5/26

AUTHOR: Gertsenshteyn, M. E.

TITLE: Phase and Frequency Distortions in Mixers

PERIODICAL: Radiotekhnika i elektronika, 1960, Vol 5, Nr 2,
pp 214-217 (USSR)

ABSTRACT: Amplitude and phase distortions in crystal mixers at super high frequencies are analyzed assuming that the mixer is a six-pole network which can be described by a corresponding matrix of conductivity. This leads, however, to cumbersome calculations and not comprehensive end results. Provided the non-uniformity of the frequency characteristic is relatively mild, approximation methods can be used. The proposed method takes the wave picture as a starting point rather than currents and voltages. Distortions can be described by the interference of several waves arriving by different ways into the

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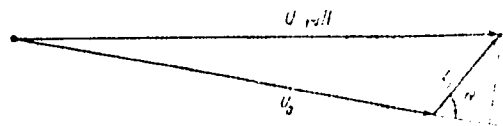
Phase and Frequency Distortions in Mixers

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SCN/109-3-2-5/26

output field of the system. In the ideal s-h-f system only one path exists, but in the real system there may be parasitic paths caused by (a) detuning in the wave guide, (b) double conversion at mirror-frequency or due to harmonics, (c) "squeezing" of the signal from the oscillator to the receiver due to poor shielding. In all these cases an analysis of the frequency characteristics amounts to a vector analysis of the diagram. The full field at the output of the system is a vector sum (see Fig. 1.)

$$\vec{U}_{full} = \vec{U}_0 + \vec{U}_1 = U_0 \left(1 + \frac{\vec{U}_1}{U_0} \right), \quad (1)$$



Card 2/9

Fig. 1.

Phase and Frequency Modulation in the

of the

where ΔA is the amplitude modulation, $\Delta \phi$ is the phase modulation, $\Delta \omega$ is the frequency modulation, and $\Delta \nu$ is the frequency shift.

$$\Delta \phi = \Delta \omega \cdot t = \Delta \nu \cdot t$$

where γ is the modulation index, $\Delta \omega$ is the angular frequency modulation, and $\Delta \nu$ is the frequency modulation.

$$\Delta A(\theta) = 8.69 \gamma \cos \theta$$

$$\Delta \phi = \gamma \sin \theta$$

The above equations are valid for small values of γ . For large values of γ , the modulation index, the equations become more complex.

Figure and Appendix B of the Report.

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Figure 10. Geometry of the system.

Figure 11. Geometry of the system.

Figure 12. Geometry of the system.

$$\alpha = \frac{\partial \Delta \gamma}{\partial \omega} \Delta \omega \approx \left(\frac{\partial \gamma}{\partial \omega} \right) \sin \theta \approx \frac{\partial \gamma}{\partial \omega} \sin \theta \Delta \omega$$

Figure 13. Geometry of the system.

$$\alpha = \frac{\partial \Delta \gamma}{\partial \omega} \Delta \omega \approx \left(\frac{\partial \gamma}{\partial \omega} \right) \sin \theta \approx \frac{\partial \gamma}{\partial \omega} \sin \theta \Delta \omega$$

Figure 14. Geometry of the system.

$$\alpha = \frac{\partial \Delta \gamma}{\partial \omega} \Delta \omega \approx \left(\frac{\partial \gamma}{\partial \omega} \right) \sin \theta \approx \frac{\partial \gamma}{\partial \omega} \sin \theta \Delta \omega$$

Figure 15. Geometry of the system.

Phase Frequency Distortion in Mixers

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large. In circuits of intermediate frequencies only the term in (1), coefficient δ_{11} is shown below

$$\delta_{11} = \frac{1}{4} \sin^2 \theta \left(\frac{\omega}{\omega_0} \right)^2 \approx \frac{1}{4} \sin^2 \theta \left(\frac{\omega}{\omega_0} \right)^2 \quad (11)$$

is expressed in terms of the parameter θ . At frequencies of signals in the middle of the pass band the parameter θ is small

$$\frac{d\theta}{d\omega} < 0, \quad \frac{d\theta}{d\omega} = 2Q \frac{1}{\omega_0} \quad (12)$$

leads to an exponential character of the change of the delay time

$$\delta_{11} = \frac{1}{4} \sin^2 \theta \left(\frac{\omega}{\omega_0} \right)^2 \approx \frac{1}{4} \sin^2 \theta \left(\frac{\omega}{\omega_0} \right)^2 \quad (13)$$

Consequently

Phase Frequency Distortion in Mixers

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Thus distortions due to phase shifts in intermediate frequency circuits can be substantially greater than when due to incident phase at all frequencies. To avoid distortions at the output of the parallel, or frequency repeater must be designed with care, with a minimum of parallel capacitance (the use of side bands is permissible). For power amplifiers placed after a travelling wave tube, where noise is of no importance, the use of diodes to rectify the energy is recommended. In the conclusion, the author reiterates the recommendation of ferrite rectifiers between the mixer and the presentation of active resistors in studies of potential mixers. There are 4 Soviet references.

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AUTHOR S: Gertsenshteyn, M. E., Kuznetsov, P. E.

TITLE: Phase Selectivity of Single-Circuit Parametric Amplifier

PERIODICAL: Radiotekhnika i elektronika, 1980, Vol. 25, No. 1, p. 1-4 (USSR)

ABSTRACT: In contrast to conventional oscillators, the phase of oscillations generated by a differential in parametric system is determined by the phase of parametric modulation. Therefore, one can expect that a parametric amplifier will operate on the phase of signal being amplified. Let it be called phase selectivity. The article deals with phase selectivity of a parametric amplifier with one degree of freedom (with reference to amplified signal). The phase selectivity causes a certain signal distortion, which disappears if several degrees of freedom are available. It is shown that, in general, the amplification degree is limited by the phase selectivity, thus it is not arbitrary. [P. 11]

Amplifiers

11. The function $f(\varphi)$ is defined by the formula

$$f(\varphi) = \frac{1}{2\pi} \int_0^{2\pi} \frac{1}{1 - \cos(\varphi - \theta)} d\theta \quad (1)$$

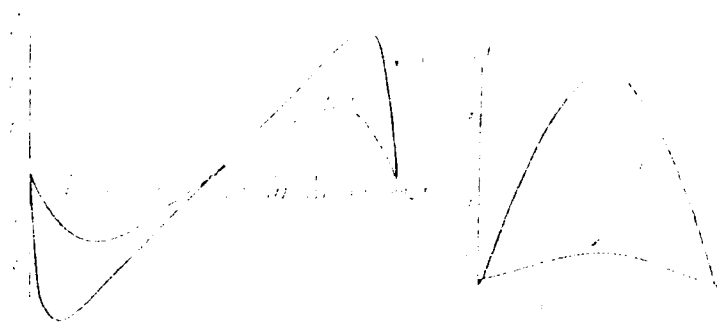
$$f(\varphi) = \frac{1}{2\pi} \int_0^{2\pi} \frac{1}{1 - \cos(\varphi - \theta)} d\theta$$

is defined. The function $f(\varphi)$ is periodic with period 2π and $f(\varphi) = \pi / (2 - \cos \varphi)$. Hence, the function $f(\varphi)$ is defined for $\varphi \in \mathbb{R}$ and $f(\varphi) = \pi / (2 - \cos \varphi)$.

$$f(\varphi) = \frac{1}{2\pi} \int_0^{2\pi} \frac{1}{1 - \cos(\varphi - \theta)} d\theta$$

end of the

1. The first of the two curves is a straight line
2. The second curve is a parabola



These results suggest that the use of a single, non-validated questionnaire to assess the prevalence of mental health problems in the community may be unreliable. The use of a validated questionnaire, such as the GHQ-12, may be more reliable and more valid than the use of a single, non-validated questionnaire.

$$(\tau) \quad \mathcal{H} = \dots; \dots; (\tau) \quad \text{---} \quad \vdots$$

$\frac{1}{2} \left(\frac{1}{2} \right) = \frac{1}{4}$

$\varphi = (\varphi_1, \dots, \varphi_n)$

$$L = \int_0^1 \int_0^1 k(t, \tau) dt d\tau = \frac{1}{2} \int_0^1 \int_0^1 \frac{1}{1 + t^2 + \tau^2} dt d\tau. \quad (11)$$

Chapman, J. H.

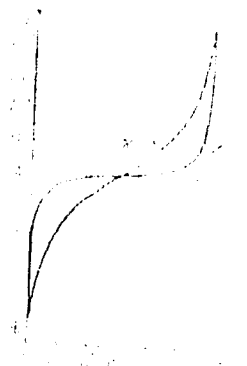
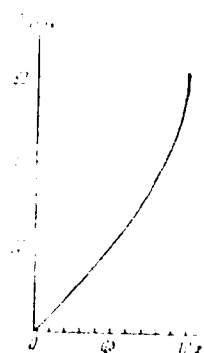
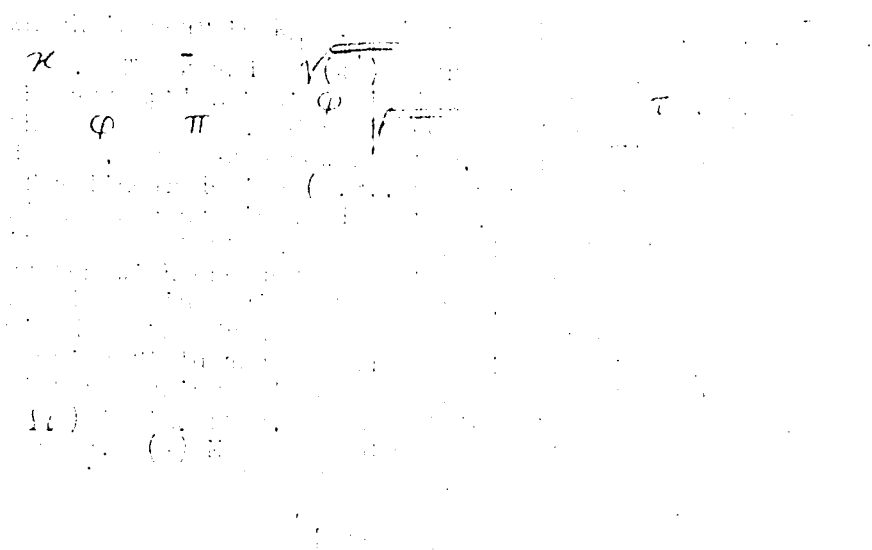
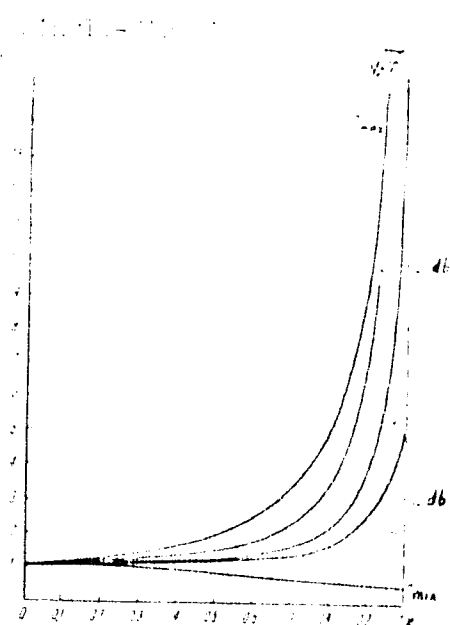


Figure 3. Theoretical and experimental
 data for the reaction





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Phase Selectivity of Single-Circuit
Parametric Amplifier

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and the term with negative frequency, $e^{-i\omega t}$, is excluded. Assuming that only resonant frequencies are essential: positive $\Omega \approx \omega_c$ and negative $\Omega - \nu \approx -\mu$, for $\nu \sim \omega_c$; $|\mu| \sim \omega$. In parametric amplifiers are sought as combinations of harmonics of the frequencies Ω and $\Omega - \nu$:

$$y = a e^{i\Omega t} + b e^{-i\mu t} + \text{c.c.}$$

where

$$a = \nu / \Omega \ll 1, \quad b = \mu / \Omega \ll 1$$

a and b are the constants which, as a function of the frequencies is shown in Fig. 1a. For the case of the μ and Ω are located symmetrically relative to the one-half the pump frequency (Fig. 1b). The solution sought is written as:

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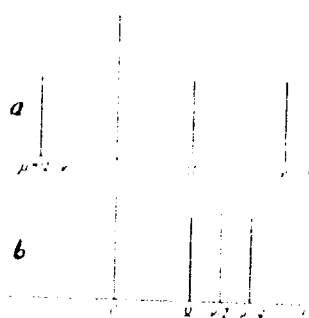


Fig. 6

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Proceedings of the 1974-1975
Biomedical Research

For a transition from a complex to a simple
normal, the model must be reduced to a single
term added. Rejection of the model is
not a valid procedure.

$$\text{Re } y = \frac{1}{2} (y + \bar{y}) = \frac{1}{2} (1 + \cos \theta) \quad (1)$$

The transition from the original model to the
new model is:

$$|k| = \frac{1}{2} (1 + \cos \theta)^{1/2} \quad (2)$$

$$\arg k = \arg \frac{1 + \cos \theta}{2} \quad (3)$$

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Phase Selectivity of Single-Diode
Parametric Amplifier

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where coefficients k_1 and k_2 are:

$$k_1 = \frac{\omega_0^2}{2D(\omega)} [\omega_0^2 - \mu^2 - 2D(\omega)] \quad (23)$$

$$k_2 = \frac{\omega_0^2 D}{D(\omega)}. \quad (24)$$

And, for the amplification of a signal Ω , $\Omega < \omega_0$, multiplying its spectrum by the coefficient k_2 and then, by a reversed Fourier transformation, we have:

$$y = \int_{-\infty}^{\infty} e^{j\omega t} [1 - z e^{j\omega t} - \frac{1}{2} \Omega^2 (\omega - \omega_0) d\omega] p(\omega) d\omega.$$

$$= z e^{j\omega t} \int_{-\infty}^{\infty} e^{-j\omega t} p(\omega - \Omega) d\omega = z(p) e^{j\omega t}.$$

$$z e^{j\omega t} \int_{-\infty}^{\infty} e^{-j\omega t} p(\omega) d\omega = [z(p) - z e^{j\omega t} p(\omega)] e^{j\omega t}. \quad (25)$$

Thus, $y = z(p) e^{j\omega t} - z e^{j\omega t} p(\omega) e^{j\omega t}.$

Phase Selectivity of Single-Circuit
Parametric Amplifier

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$$I_1(t) = \int_{-\infty}^{+\infty} e^{i\omega t} \psi(\omega) d\omega$$

Thus, in the case of a signal of any shape, phase selectivity is also present. (6) Noise Amplification. White spectrum noise is the totality of incoherent sinusoids with arbitrary phases; their amplification coefficient is (31). With a quadratic indicator, it is:

$$|K^2| = \frac{1+x^2}{(1-x^2)^2} \quad (29)$$

Consequently, phase selectivity does not play any role in noise amplification. Equation (29) is also valid if not only the phase of the amplified signal, but also the phase of the pumping field is arbitrary (or at

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Phase Selectivity of Single-Circuit
Parametric Amplifier

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random). It seems that the field of an incoherent source can be used as the pumping field. Noises and distortions of such an amplifier, of course, should be investigated separately. (7) Influence of Phase Selectivity. From the above, it follows that phase selectivity leads to amplitude and phase modulation of the signal being amplified. Pulses at the output of a parametric amplifier are amplitude-modulated. This modulation can be removed with the help of a system of automatic amplitude regulation in the receiver. Analyzing FM of the signal, the spectral method is recommended. Conclusions: (1) A parametric amplifier with one degree of freedom, when amplifying a signal with frequency Ω , causes a beat modulation of the amplified signal, resulting in phase oscillations $\nu - 2\Omega$. (2) Solutions for near-resonance area by simplified equations and complex amplitude methods are identical, and the method of complex amplitudes can be used for the solution of more complicated problems. (3) A parametric amplifier with one degree of freedom is phase-selective, as its instant

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GERTSENSHTEYN, M. Ye.; VASIL'YEV, V.B.

In regards to S. I. Al'ber and V. I. Bespalov's letter "Diffusion
equation for a statistically nonhomogenous wave guide. Radio-
tekh. i elektron. 6 no.3:449-450 Mr '61. (MIRA 14:3)

(Wave guides)

(Al'ber, S. I.)

(Bespalov, V. I.)

89206

S/056/61/040/CO1/012/037
B102/B204

24.4400

AUTHOR: Gertsenshteyn, M. Ye.

TITLE: The laws of conservation in the general relativity

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 40,
no. 1, 1961, 114-122

TEXT: The author deals with two points in the theory of the laws of conservation which are, seen from the mathematical viewpoint not clear: 1) The energy momentum vector $P_i = \int t_i^k dS_k$ is in this integral representation not satisfactory, because the vector addition is not defined. 2) In the representation of the coordinate transformation (2):

$\delta x^i = \xi^i(x) = x_j^i(x) \delta \omega^j$, where $\delta \omega^j$ are the parameters of an element of the irreducible group of coordinate transformation (translation or rotation), it is not definitely said what functions $\xi^i(x)$ correspond to the translation. Integrals like the one abovementioned occur in the general relativity when the laws of conservation are being studied. If t_i^k is an energy momen-

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The laws of conservation ...

tum pseudotensor, and if composition (integration) is carried out according to components (the coordinates are Euclidean at infinity), then the integral is independent of coordinate system; if, at $x^\alpha \rightarrow \infty$, ξ^i tend \rightarrow const, the integral quantities, which were obtained in the integration of various energy-momentum tensors (which are produced by (2)), coincide. Such a situation, where the mathematical operation employed is not defined, and obtains sense only by the nature of the expression under the integral, is considered to be unsatisfactory by the author. Definition of the integral and the translation is purely geometric, and ought to be independent of the physical content of the problem. For determination of this integral in Riemann geometry, a so-called "free" vector field is introduced, which uniquely (i.e., independent of path) describing the shift of the origin of the coordinates is introduced: $P_i(x) = \hat{C}P_i(x_0)$, where \hat{C} is the operator of the "harmonic" shift. $\xi^i(x)$ is considered to be a vector field, which obeys the following conditions: $\xi^i(x.x_0)$ is a unique function, $\xi^i(x)$ are vectors which are parallel in Euclidean space. Thus it is possible, like above, to put $\xi^i(x) = \hat{C}\xi^i(x_0)$. The harmonic shift is defined in all spaces

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The laws of conservation ...

that are topologically equivalent to Euclidean space; however, it differs from a parallel shift. For the "free" vector in a curvilinear pseudoeuclidean space $\nabla_k P^s(x) = 0$ holds, ∇_k denotes a covariant derivative, if k and s are independent, this equation contains 16 conditions. With the definition of the invariant $\xi = \nabla_k P^k = \text{div} P$, and separation of the symmetric and anti-symmetric part, $\xi_{ik} = \nabla_k P_i + \nabla_i P_k$, $\eta_{ik} = \nabla_k P_i - \nabla_i P_k$, it is possible to impose onto the vector field $P_i(x)$ the condition $\xi_{ik} = 0$ (which in itself comprises 10 conditions). These conditions have already been studied by V. A. Fok. They are satisfied only in a space of constant curvature ($\nabla_s R = 0$). The conditions (13): $\xi = 0$, $\eta_{ik} = 0$ (7 conditions) are, on the other hand, satisfied in the case of arbitrary R_{iks}^m . The solution of (13) is given with $P_k = \nabla_k \psi = \partial \psi / \partial x^k$; $\square \psi = 0$. The general-covariant linear differential equations (13) define the geometric operation of a "harmonic" translation

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The laws of conservation ...

of the vector in a unique manner. There now exists, also in the general case of a space of arbitrary curvature, a preferred system of coordinates, in which the components of the vector remain unchanged in the case of a shift. The condition

$$\partial(\sqrt{-g} g^{ik})/\partial x^i = 0; g^{im} \Gamma_{im}^k = 0 \text{ determines the class of the}$$

"harmonic" (preferred) system of coordinates. In such a system, the covariant vector components in harmonic translation do not change, and it is therefore possible to integrate the vectors by the components. Energy-momentum vector, - pseudotensor, energy density, and the Hamiltonian of the system should, therefore, be calculated in such a harmonic system. The case of infinitely small coordinate transformations is studied and the formula hereby for the energy-momentum tensor is applied to the gravitational field. For the canonic energy-momentum tensor, a unique expression is obtained which after symmetrization goes over into the Landau-Lifshits tensor. In conclusion, the case is studied in which the gravitational field may be considered to be a slight perturbation, and the results of calculations are compared in the various systems of coordinates. The

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The laws of conservation ...

author finally thanks V. L. Bonch-Bruyevich, Professor A. Z. Petrov,
A. A. Fedorov, and L. G. Solovey for discussions. There are 10 references:
4 Soviet-bloc and 4 non-Soviet-bloc.

SUBMITTED: October 8, 1959 (initially) and March 9, 1960 (after revision)

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9.9867

26412
S/056/61/041/001/007/021
B102/B214

AUTHOR: Gertsenshteyn, M. Ye.

TITLE: Wave resonance of light and gravitational waves

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41,
no. 1(7), 1961, 113-114

TEXT: This paper gives an estimate of the energy of gravitational waves produced during the propagation of light in a constant electric or magnetic field. According to general relativity light and gravitational waves propagate with equal velocity, and the corresponding rays coincide with the zero geodesics. That means that, if there exists a linear relationship between light and gravitation waves, wave resonance known in radio physics must appear so that even in weak coupling a significant energy transfer may take place. In the presence of an electromagnetic field a weak gravitational field is described by

$$\square \psi^A = -16\pi c^{-4} T^A, \quad \tau^A = 0, \quad \tau^A_A = 0, \quad (1)$$

$$\tau^A = \frac{1}{4\pi} (F^A F_A - \frac{1}{4} \delta^A_B (F^{Bm} F_{mB})), \quad \psi^A = h^A - \frac{1}{2} h \delta^A_B$$

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Wave resonance of light and ...

where τ^{ik} is the energy - momentum tensor of the electromagnetic field, F^{ik} is the electromagnetic field tensor, γ the gravitational constant, and h_{ik} the perturbation of the metric tensor. Eq. (1) is used for investigating the propagation of light (F^{ik} field) in the presence of a strong magnetizing field $F^{(0)ik}$ constant in space and time. The energy - momentum tensor becomes the sum of three terms: square of a constant term, square of the light wave field, and an interference term describing the wave resonance. On neglecting the non-resonance term one obtains the relation

$$\square \Psi_k = -\frac{8\gamma}{c^2} \left[F^{(0)ll} F_{kl} - \frac{1}{4} \delta_k^l (F^{(0)lm} F_{lm}) \right]. \quad (2).$$

If the x-axis is taken in the direction of the wave vector and the wave amplitude is expressed in the units of energy density, one obtains

$$F_{kl} = b(x) f_{kl} e^{ikx}, \quad f_{0l} f_{0l} = 1, \quad k = \omega/c, \quad (3)$$

$$\Psi^{ik} = a(x) \sqrt{16\pi\gamma/c^4 k^2} \zeta^{ik} e^{ikx}, \quad \zeta_{ik} \zeta^{ik} = 1, \quad \zeta_i^i = 0;$$

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Wave resonance of light and ...

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where the amplitudes f_{kl} and $i k$ are dimensionless. With this one obtains in the approximation of slowly varying amplitudes: $i da(x)/dx$

$= \sqrt{\gamma/\pi c^4} F^{(0)il} f_{kl} \int_i^k b(x) dx$. The solution of this equation has the form

$a(x) = i \sqrt{\gamma/\pi c^4} f_{kl} \int_i^k \int_0^x F^{(0)il}(s) b(s) ds + a(0)$, where the integration

is made along the ray. If $a(0) = 0$ the external field is constant and the absorption or scattering of the light along the ray is small in the domain

considered; i.e. $b(s) = \text{constant}$ so that $|a(x)/b(0)|^2 = (\gamma/\pi c^2) F^{(0)2} T^2$, where T is the time in which the ray traverses the constant field. The amplitude packet was here set equal to one. If the $F^{(0)}$ field is turbulent and random, it can be assumed for the purpose of estimating the energy of

the gravitational wave that $F^{(0)}$ is constant along a path of length R_0

(R_0 - correlation radius of the $F^{(0)}$ field) and then changes by jumps and at random. The light amplitude $b(x)$ is practically constant along the ray; the amplitude of the gravitational wave is given by

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Wave resonance of light and ...

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$$a(x) = \sum a_n; \quad a_n = i \sqrt{\gamma/\pi c^3} f_n \zeta_n^+ \int_{\zeta_{n-1}}^{\zeta_n} F^{(0)H}(s) b(s) ds.$$

The gravitational waves excited at each portion of the path become incoherent. One obtains: $|a(x)/b|^2 = (\gamma/\pi c^3) F^{(0)2} R_0 T$. (7). For interstellar fields one obtains, for example, $|a/b|^2 \sim 10^{-17}$, $(T^{(0)} = 10^{-5} G$, $R_0 = 10$ light years, $T = 10^7$ years). The frequency of the excited

gravitational wave is determined by the light frequency. Strong magnetic fields exist also inside the stars, and therefore gravitational waves can be produced. Here the correlation radius $a(x)$ is essentially determined by the free path of the radiation. For the calculation of the intensity of this wave (7) can also be used, but then T is the diffusion time of the energy of the ray in the star transparent to the radiation. It can be shown that (7) represents the ratio of the gravitational and light radiations of the star. Naturally, the intensity of the gravitational radiation is small and is unimportant for the energy balance of the star. There are 3 Soviet-bloc references.

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S/109/62/007/001/025/027
D266/D301

9.3240 (1040, 1139, 1154)

AUTHOR: Rabinovich-Vizel', A.A., and Gertsenshteyn, M.Ye.

TITLE: On the bandwidth of frequency multipliers employing non-linear capacitance

PERIODICAL: Radiotekhnika i elektronika, v. 7, no. 3, 1962, 175 - 177

TEXT: The purpose of the paper is to determine the bandwidth of frequency multipliers using non-linear elements. The authors first survey available literature and conclude that the efficiency of this type of frequency multiplier has received much attention, but hardly anything has been written on the attainable bandwidth. Next they quote K.M. Johnson's formulas, slightly rearrange them and find for the product of relative bandwidth and optimum efficiency

$$\eta_{\text{opt}} \frac{\Delta f}{f} = \sqrt{b_n^2 + (\omega_1 \tau)^2} \cdot \omega_1 \tau \quad (6)$$

where b_n depends on the nonlinear characteristics of the diode em-
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On the bandwidth of frequency ...

ployed. ω_1 - fundamental frequency, τ - time constant of the diode,
n - factor of multiplication. For a lossless diode

$$\tau = 0, \eta = 1, \frac{\Delta f}{f} = b_n, (Q_{D1} b_n)^2 \gg 1 \quad (7)$$

where Q_{D1} - quality of the diode at the frequency ω_1 . In this case
the bandwidth is dependent on n. If the losses are large $Q_{D1} b_n \ll 1$,
the bandwidth is mainly determined by the losses and independent of
the harmonic number. If non-linear resistances are used there is no
difficulty with bandwidth because broadband matching is possible.
There are 5 references: 1 Soviet-bloc and 4 non-Soviet-bloc. The 4
most recent references to the English-language publications read as
follows: C.H. Page, J. Res. Nat. Bur. Standards, 1956, 56, 4, 179;
G. Luetgenau, M.V. Duffin, and P.H. Dirnbach, IRE Wescon Convention
Record, 1960, part 3, 13; P.M. Fitzgerald, T.H. Lee, M.S. Moy, E.J.
Powers and J.J. Younger, IRE Wescon Convention Record, 1960, part 2
43; K.M. Johnson, IRE Trans., 1960, MTT-8, 5, 525.

SUBMITTED: July 20, 1961
Card 2/2

2/100/00/007/003/005/029
0234/1702

AUTHORS: Gertsenshteyn, N.Ye., and Kimber, B.Ye

TITLE: Stability of the super-regenerative regime of an amplifier with complex networks

PERIODICAL: Radiotekhnika i elektronika, v. 7, no. 3, 1962,
397 - 403

TEXT: The authors formulate equations for a parametric amplifier with variable capacity without frequency transformation, considering it as an n-terminal network. For the case of a two-circuit non-degenerate regenerative amplifier, an equation of Hill's type is deduced from the general equations; the stability of the solutions is determined by that of the solutions of the corresponding homogeneous equation. It is found that if a compensated input filter is used, whose band is not much wider than that of the amplifier, the domains of stability depend essentially on the parameters of superization. The case of an input filter consisting of two equal links is considered as an example; the homogeneous equation is reduced

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